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ORIGINAL ARTICLE

EFFECT OF ACARBOSE ON *IN VITRO* INTESTINAL ABSORPTION OF MONOSACCHARIDES IN DIABETIC RATS

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Background – **Acarbose is known to lower blood glucose concentration by functioning as an á-glucosidase inhibitor in the intestine. It is also suggested that acarbose may directly arrest the intestinal absorption of hexoses. The purpose of the present study was to further elucidate the normal intestinal absorption of hexoses and the effect of acarbose on the rate of intestinal absorption of monosaccharides in normal and streptozocin-induced diabetic rats.**

Methods – **Segments of small intestine, as everted sacs, from normal and diabetic rats were incubated in solutions of various concentrations of monosaccharides, with and without acarbose, at 37º C for 90 min and the sugar concentration was measured before and after incubation. Student's *t*-test with $p < 0.05$ was used to compare the mean ± standard error of the mean values for intestinal absorption rates of various sugars in different groups of rats.**

Results – **The optimum effective dose of most sugars for intestinal absorption was 100 mg/dL and the best inhibitory dose of acarbose was 1 mg/mL. The rate of intestinal absorption of glucose and galactose in the presence of acarbose was significantly reduced in both normal and diabetic rats, while fructose and sucrose absorption was not affected significantly by acarbose in diabetic rats. Mannose absorption was not affected significantly by acarbose.**

Conclusion – **Acarbose directly arrested the intestinal absorption of most hexoses at different rates, probably due to different mechanisms involved in the intestinal absorption of monosaccharides.**

Keywords acarbose diabetic rats intestinal absorption streptozocin

Introduction

There are a number of reports on the blood glucose lowering effect of acarbose.[1–4] Acarbose is a microbial pseudotetrasaccharide widely used in the treatment of both insulin-dependent and non-insulin-dependent diabetes mellitus.[5–7] The therapeutic action of this hypoglycemic drug is generally attributed to its á-glucosidase inhibitory effects on carbohydrate digestion in both man and rats.[8–11] This reduces the digestion of oligosaccharides in the proximal half of the small intestine, delaying, by prolonging the absorption of monosaccharides after the meal. Thus, in patients with diabetes, acarbose decreases postprandial hyperglycemia. Acarbose is also reported to cause a reduction in hexose absorption in animals.[12]

The mechanism and rate of intestinal absorption are not the same for all monosaccharides. Glucose and galactose are believed to be primarily absorbed by an active transport system,[8] while facilitated transport is known to be involved in fructose absorption.[13] The present study was undertaken to further elucidate the normal intestinal absorption of hexoses and the effect of acarbose on the rate of intestinal absorption of monosaccharides in normal and streptozocin-induced diabetic rats. A range of increasing concentrations of sugars and acarbose was used to determine the best dose for sugar absorption and acarbose inhibition.

Materials and Methods

Male Sprague-Dawley rats weighing 250 to 300

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